# PATENT COOPERATION TREATY

# PCT



## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference<br>31373-WO-U | **FOR FURTHER ACTION** | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| International application No.<br>PCT/BE 03/00130 | International filing date *(day/month/year)*<br>24.07.2003 | Priority date *(day/month/year)*<br>03.09.2002 |
| International Patent Classification (IPC) or both national classification and IPC<br>F04C29/10 | | |
| Applicant<br>ATLAS COPCO AIRPOWER, NAAMLOZE VENNOOTSCHAP | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

| Date of submission of the demand | Date of completion of this report |
|---|---|
| 06.02.2004 | 07.04.2004 |
| Name and mailing address of the international preliminary examining authority:<br>European Patent Office - P.B. 5818 Patentlaan 2<br>NL-2280 HV Rijswijk - Pays Bas<br>Tel. +31 70 340 - 2040 Tx: 31 651 epo nl<br>Fax: +31 70 340 - 3016 | Authorized Officer<br>Kapoulas, T<br>Telephone No. +31 70 340-2237 |

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/BE 03/00130

## I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

**Description, Pages**

1-13 as originally filed

**Claims, Numbers**

1-17 as originally filed

**Drawings, Sheets**

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   *(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Yes: | Claims | 1-17 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-17 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-17 |
| | No: | Claims | |

2. Citations and explanations

   **see separate sheet**

Re Item V

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Document US 2002/0088241 A1 disclosing a speed control system for a refrigerant compressor is considered as the closest prior art.

The problem posed by the present invention is to extend the regulated speed range of a speed regulated compressor beyond the conventional fixed speed range, which is being set on the basis of the most adverse operating circumstances, allowing a higher speed range and hence using to the full the compressor capacity while maintaining a safety against overheating to avoid damaging of the compressor components.

The solution is given by a compressor with a dynamic speed limiter including a hysteresis module in which an upper temperature limit is defined as well as a minimum and a maximum speed value, determined by the mechanical limitations and temperature resistance of the compressor rotating parts, whereby the compressor speed is lowered or increased by speed jumps when the rotational speed is situated close to the maximum speed respectively to the minimum speed at the moment that the compressor outlet temperature reaches the said upper temperature limit as disclosed in claim 1. In this way the speed control is extended taking advantage of the full capacity of the compressor.

The compressor in accordance with US 2002/0088241 A1 uses an inverter for continuously changing the speed of the electric motor driving the compressor according to temperature values of the conditioned air and the target temperature of the space to be conditioned. No other document of the prior art discloses a speed control with the combination of features of claim 1.

Hence claim 1 satisfies the requirements of Article 33 PCT as new and inventive.

The features of dependent claims 2-13 and claims 14-17 pertaining to a dynamic speed limiter are also in combination not derivable from the prior art documents. Hence claims 2-17 satisfy the requirements of Article 33 PCT.

Remarks

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document US 2002/0088241 A1 is not mentioned in the description, nor is this document identified therein.

2. The features of claims 1-12 relate to a method of operation rather than clearly defining an apparatus in terms of its technical features. Also the introduction of these claims: "Improvements to compressors" does not permit to define to what these improvements are brought about. Hence claims 1-12 do not meet the requirements of Article 6 PCT. It would be appropriate to introduce these claims as method claims in which case claim 13 should be deleted.

3. Claims 14 and 15 are mutually not clear because it would seem that by these two claims different definitions for the same dynamic speed limiter are given.